

Amended Claims
37 CFR 1.121(c)(3)

21. (New) Method for the production of a nucleic acid molecule comprising the steps
- a) providing an oligonucleotide which is prepared by the following steps:
 - aa) coupling one end of an oligonucleotide to a solid matrix wherein the coupling is effected by means of a modification and the oligonucleotide contains a recognition sequence for a type IIS restriction enzyme which cleaves outside its recognition sequence,
 - ab) adding an additional oligonucleotide which is at least partially double-stranded and contains a different recognition sequence than in step aa) for a type IIS restriction enzyme which cleaves outside its recognition sequence, whereby this oligonucleotide cannot bind to the matrix,
 - ac) ligating the oligonucleotides from steps aa) and ab) in the orientation determined by the blockage of the ends that are not to be ligated,
 - ad) removing non-consumed reactants and enzymes,
 - ae) cleaving the ligation product from step ac) with a type IIS restriction enzyme which cleaves outside its recognition sequence whereby the cleavage occurs in the nucleic acid sequence of the oligonucleotide from step ab),
 - af) separating the reaction mixture from the elongated oligonucleotide from step aa) obtained in step ae),
 - ag) repeating steps ab) to af) at least once,

- ba) coupling one end of an oligonucleotide to a solid matrix wherein the coupling is effected by means of a modification and the oligonucleotide contains a recognition sequence for a type IIS restriction enzyme which cleaves outside its recognition sequence,
- bb) adding an additional oligonucleotide which is at least partially double-stranded and contains a different recognition sequence than in step ba) for a type IIS restriction enzyme which cleaves outside its recognition sequence, whereby this oligonucleotide cannot bind to the matrix,
- bc) ligating the oligonucleotides from steps ba) and bb) in the orientation determined by the blockage of the ends that are not to be ligated,
- bd) removing non-consumed reactants and enzymes,
- be) cleaving the ligation product from step bc) with a type IIS restriction enzyme which cleaves outside its recognition sequence whereby the cleavage occurs in the oligonucleotide from step bb),
- bf) separating the nucleic acid molecule elongated in this manner from the reaction mixture,
- bg) repeating steps bb) to bf) at least once, wherein after the last ligation in step bc) and removing non-consumed reactants and enzymes, the ligation product is cleaved with a type IIS restriction enzyme whereby the cleavage occurs in the oligonucleotide from step ba),

- bb) adding an additional oligonucleotide which is at least partially double-stranded and contains a different recognition sequence than in step ba) for a type IIS restriction enzyme which cleaves outside its recognition sequence, whereby this oligonucleotide cannot bind to the matrix,

- bc) ligating the oligonucleotides from steps ba) and bb) in the orientation determined by the blockage of the ends that are not to be ligated,

- bd) removing non-consumed reactants and enzymes,

- be) cleaving the ligation product from step bc) with a type IIS restriction enzyme which cleaves outside its recognition sequence whereby the cleavage occurs in the oligonucleotide from step bb),

- bf) separating the nucleic acid molecule elongated in this manner from the reaction mixture,

- bg) repeating steps bb) to bf) at least once, wherein after the last ligation in step bc) and removing non-consumed reactants and enzymes, the ligation product is cleaved with a type IIS restriction enzyme whereby the cleavage occurs in the oligonucleotide from step ba),

- c) ligating the oligonucleotides from steps a) and b) in the orientation determined by the blockage of the ends that are not to be ligated,
- d) removing non-consumed reactants and enzymes,
- e) cleaving the ligation product from step c) with a type IIS restriction enzyme which cleaves outside its recognition sequence whereby the cleavage occurs in the oligonucleotide from step a) or b),
- f) separating the nucleic acid molecule elongated in this manner from the reaction mixture.

- 22. (New) Method as claimed in claim 21, wherein the oligonucleotide used in step ab) or bb) is a nucleic acid molecule produced by the method as claimed in claim 21.
- 23. (New) Method as claimed in claims 21 or 22, wherein an exonuclease and/or phosphatase reaction is carried out as step ac)', bc)' or c)' after step ac), bc) or c).
- 24. (New) Method as claimed in claim 23, wherein the reaction mixture of step ac)', bc)' or c)' is removed after the reaction.
- 25. (New) Method as claimed in one of the claims 21 to 23, wherein the end of the oligonucleotide from step a), aa) or ba) that is not coupled to the matrix contains a part of a recognition sequence for a type IIS restriction enzyme which cleaves outside its recognition sequence and the other part of the recognition sequence for this restriction enzyme is derived from the oligonucleotide from step ab), bb) or b).
- 26. (New) Method as claimed in claims 21 to 25, wherein the modification is a biotin residue, a digoxigenin residue, a fluorescein isothiocyanate residue, an amino compound or a succinyl ester.

35. (New) Kit for the production of a nucleic acid sequence by the method as claimed in one of the claims 21 to 34, comprising:
- a) a library of 1 to 1,048,576 different oligonucleotides wherein the oligonucleotides can be coupled to a solid matrix by means of a modification at one end and the oligonucleotide contains a recognition sequence or a part of the recognition sequence for a type IIS restriction enzyme which cleaves outside its recognition sequence,
 - b) an additional library of 4 to 1,048,576 different oligonucleotides wherein each of the oligonucleotides contains a recognition sequence for a type IIS restriction enzyme which cleaves outside its recognition sequence which is different from the type IIS restriction enzyme from aa), ba) or a) and optionally contains the other part of the recognition sequence of the restriction enzyme from step aa), ba) or a)
 - c) a solid matrix,
 - d) reservoirs for the enzymes required to produce the nucleic acid molecule and/or other reagents.
36. (New) Device for the automated production of a nucleic acid molecule by a method as claimed in one of the claims 21 to 34, characterized in that it contains
- a) a library of 1 to 1,048,576 different oligonucleotides wherein the oligonucleotides can be coupled to a solid matrix by means of a modification at one end and the oligonucleotide contains a recognition sequence or a part of the recognition sequence for a type IIS restriction enzyme which cleaves outside its recognition sequence,
 - b) an additional library of 4 to 1,048,576 different oligonucleotides wherein each of the oligonucleotides contains a recognition sequence for a type IIS restriction enzyme which cleaves outside its recognition sequence which is different from the type IIS restriction enzyme from aa), ba) or a), and optionally contains the other part of the recognition sequence of the restriction enzyme from step aa), ba) or a),

